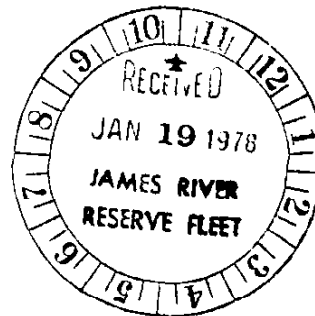




m-2710
UNITED STATES DEPARTMENT OF COMMERCE
Maritime Administration
Washington, D.C. 20540



JAN 18 1978

MEMORANDUM FOR: Distribution List

Subject: Nuclear Power Barge STURGIS

Enclosed for action or information as appropriate is an executed copy of an Interagency Support Agreement between the Maritime Administration and U. S. Army Facilities Engineering Support Agency covering the terms and conditions relative to the long-term holding of the deactivated Nuclear Power Barge STURGIS in the James River National Defense Reserve Fleet.

This agreement does not become operative until the U. S. Army Facilities Engineering Support Agency has obtained approval of the Nuclear Regulatory Commission (NRC), to moor the STURGIS at the James River National Defense Reserve Fleet.

It is anticipated that NRC will approve the Army's plans and the STURGIS will be tendered to the Maritime Administration at the STURGIS' berth at Fort Belvoir, Virginia, about March 15, 1978. At that time MarAd will accept the barge, tow it to a shipyard for lay-up preparation, and moor it in the James River Fleet.

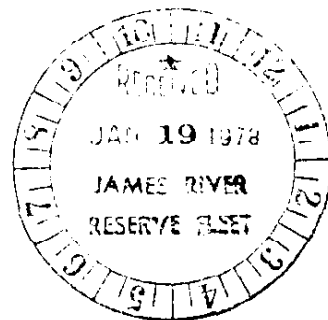
Any questions concerning this matter should be referred to the Chief, Division of Reserve Fleet.

Signed Burt Kyle
BURT KYLE
Director, Office of Domestic Shipping

Enclosure

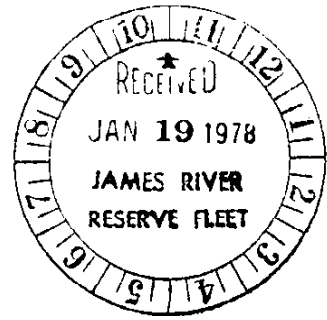
Recommend reading
entire document to be
familiar with what this
does to us. KWF.

	INITIAL	DATE	ACTION
Fleet Supt.	KWF	1/19/78	
Fleet Capt.	AS	1/19	
Fleet Engr.	DOH	1/20	
Adm. Asst.			
Jance			File - STURGIS



Distribution List

2100
2700
2710 ✓
300
310
320
322
330
333
350
373
540
742



INTERAGENCY SUPPORT AGREEMENT
BETWEEN
MARITIME ADMINISTRATION
AND
US ARMY
FACILITIES ENGINEERING SUPPORT AGENCY

1. PURPOSE. The purpose of this agreement is to delineate responsibilities and establish working arrangements between the Maritime Administration (designated host) and the Facilities Engineering Support Agency (designated tenant) for support of the decommissioned Nuclear Power Barge STURGIS.

2. APPLICABILITY. The provisions of this agreement apply to support required by the STURGIS after completion of decommissioning activities at Fort Belvoir, Virginia, and during its initial drydocking, mooring, periodic surveillance, and subsequent drydocking(s) and remooring(s) during the period of long-term (50 years) storage in the James River National Defense Reserve Fleet.

3. GENERAL PROVISIONS.

a. The completion of the STURGIS (MH-1A Nuclear Power Plant) decommissioning will be in accordance with the Decommissioning Plan dated 30 March 1977, with approved changes and applicable regulations and standards.

b. Upon completion of decommissioning, the nuclear system will have been deactivated and the components disposed of or enclosed in specific restricted areas.

c. Post-decommissioning surveillance and environmental monitoring of the decommissioned structure will be a continuing joint effort of the host and the tenant.


4. RESPONSIBILITIES. Responsibilities are delineated in Annex A which is incorporated as part of this agreement. The responsibilities not specifically stated in Annex A remain the responsibility of the Facilities Engineering Support Agency.

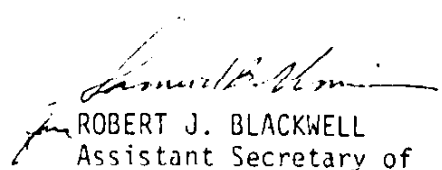
5. FUNDING. Under the provisions of the Economy Act (31 USC 686), FESA will reimburse the Maritime Administration for expenses incurred in handling the STURGIS, both during drydockings and at the James River Reserve Fleet. Payment to the host for these expenses shall be made by the tenant upon receipt of written request for payment.

6. TERM. This agreement will be effective when approved by the respective approving authorities and will remain effective until such time as terminated by mutual agreement of the parties hereto or by either party upon 180 days of written notice.

7. AMENDMENTS. The terms of this agreement are subject to change by amendment, mutually consented to by the final approving authority of the host and tenant. Such changes will be made in writing.

IN WITNESS WHEREOF, the parties have executed this agreement as of the dates set out beneath the signatures of their respective representatives.


WALTER O. BACHUS
Brigadier General, USA
Director of Facilities Engineering
Office, Chief of Engineers


ROBERT J. BLACKWELL
Assistant Secretary of
Maritime Affairs
Maritime Administration
US Department of Commerce

11/1/78
(Date)

1/13/78
(Date)

ANNEX A

INTERAGENCY SUPPORT AGREEMENT
BETWEEN MARAD AND USAFESA

RESPONSIBILITIES

<u>Item No.</u>	<u>Description</u>	<u>MARAD</u>	<u>FESA</u>
1.	Conduct final radiological survey of STURGIS at Fort Belvoir (includes furnishing copy of report to MARAD)		X
2.	Obtain approval of the Nuclear Regulatory Commission to moor the STURGIS at the James River National Defense Reserve Fleet		X
3.	* Develop specifications for long-term (50 years) lay-up of the STURGIS	X	
4.	* Prepare drydocking plan for shipyard work required on STURGIS	X	
5.	* Contract for shipyard work	X	
6.	Tow STURGIS from Fort Belvoir to shipyard for drydocking	X	
7.	Monitor shipyard performance and provide systems technical information during drydocking		X

*Subject to FESA review and approval

<u>Item No.</u>	<u>Description</u>	<u>MARAD</u>	<u>FESA</u>
8.	Provide health physics services at drydock facility		X
9.	Tow STURGIS from drydock facility to James River Reserve Fleet	X	
10.	Prepare and implement mooring plan	X	
11.	Hook-up Cathodic System	X	
12.	Procure and install flooding alarms	X	
13.	Procure and install barrier alarms	X	
14.	Supply normal JRRF security (includes barrier inspections)	X	
15.	Supply normal JRRF firefighting support	X	
7. 16.	Perform annual hull and mooring inspections (includes furnishing copy of report to FESA)	X	
17.	Provide shore-to-ship transportation for FESA Semiannual Radiation and Physical Inspection and Environmental Surveys	X	
18.	Execute the Post-Decommissioning Environmental Radiation Monitoring Plan (includes furnishing copy of report to MARAD)		X

<u>Item No.</u>	<u>Description</u>	<u>RAD</u>	<u>FESA</u>
19.	Conduct radiological monitoring portion of site surveillance (includes furnishing copy of report to MARAD)		X
20.	Conduct physical inspections in conjunction with environmental and radiological monitoring		X
21.	Inform FESA of any significant structural abnormalities, security violations, grounding of the vessel or damage to the mooring system, major flooding or sinking of the vessel as soon as possible but within 24 hours at the following phone numbers: Operations Division: (703) 664-5245 * Headquarters Company: (703) 664-1740 * (After Duty Hours)	X	
22.	Provide qualified health physicists equipped with appropriate radiation survey equipment for a Special Investigative Team in the event of sabotage, severe accident, or damage caused by natural occurrence to the STURGIS		X
23.	Provide diver on request for a Special Investigative Team in the	X	

*w/o CARR
703-664-6245*

<u>Item No.</u>	<u>Description</u>	<u>MARAD</u>	<u>FESA</u>
23. (con'd)	event of sabotage, severe accident, or damage caused by natural occurrence to the STURGIS		
24.	Disconnect the STURGIS mooring for tows to shipyard	X	
25.	Tow STURGIS from JRRF to shipyard for drydocking(s)	X	
26.	Contract for and monitor drydocking(s) IAW item no. 4	X	
27.	Tow STURGIS from shipyard to JRRF after periodic drydocking(s)	X	
28.	Handle public relations matters		X
29.	Provide for final disposition of STURGIS after 50 years storage		X
30.	Provide five-year annual costs estimates	X	
31.	Provide funds by DA Form 2544, Intra- Army Order for Reimbursable Services, upon receipt of written estimate. Quarterly billings on SF 1080, Voucher for Transfers Between Appropriations and/or Funds, will be submitted as specified by the DA Form 2544		X
32.	Agrees to idemnify, defend, and save the Maritime Administration harmless from and against any and		X

<u>Item No.</u>	<u>Description</u>	<u>MARAD</u>	<u>FESA</u>
32. (con'd)	all claims, causes, actions proceedings, liabilities, and costs for loss or damage to third persons arising out of, connected with, or resulting from, the re-deployment to and mooring in the James River Reserve Fleet of the Power Barge STURGIS in accordance with applicable Federal rules and regulations		X
33.	Comply with Technical Specifications for the Decommissioned Nuclear Power Barge STURGIS as applicable (Attachment A)	X	X

TECHNICAL SPECIFICATIONS
FOR THE
DECOMMISSIONED
NUCLEAR POWER BARGE "STURGIS"

19 December 1977

Commander and Director
USAFESA
ATTN: FESA-OD
FORT BELVOIR, VA 22060

U. S. ARMY
FACILITIES ENGINEERING SUPPORT AGENCY
FORT BELVOIR, VIRGINIA 22060

CONTENTS

	<u>Page</u>
1.0 INTRODUCTION	1
1.1 Purpose	1
1.2 Definitions	2
2.0 RADIOACTIVE RELEASES	2
3.0 ADMINISTRATIVE CONTROLS	2
3.1 Administrative Responsibility	2
3.2 Records	2
3.3 Visitors	3
3.4 Reports	3
(1) Annual Report	3
(2) Substantial Variation	3
(3) Reportable Occurrence	3
3.5 Procedures and Instructions	4
3.6 Review and Audit Committee	4
3.7 Surveillance Requirements	5

1.0 INTRODUCTION

1.1 Purpose

The purpose of these Technical Specifications is to delineate the administrative responsibilities and surveillance requirements for the decommissioned Nuclear Barge STURGIS to assure that public health and safety interests are protected.

1.2 Definitions

The defined terms of this section appear in capitalized type in these Technical Specifications. Capitalization denotes the use of the defined term in subsequent sections.

1.2.1 ENTOMBMENT. ENTOMBMENT consists of sealing all the remaining highly radioactive or contaminated components within a structure integral with the biological shield after having all fuel assemblies, radioactive fluids and wastes, and certain selected components shipped offsite. The structure provides integrity over the period of time in which significant quantities of radioactivity remain with the materials in the entombment. An appropriate and continuing surveillance program is established.

1.2.2 SURVEILLANCE REQUIREMENT. SURVEILLANCE REQUIREMENTS relate to structural inspection, radiation surveys, security surveillance and environmental monitoring performed to assure (1) that access control and integrity of physical barriers are maintained and (2) that radioactive material is not escaping or being transported through the containment barriers to unrestricted areas onboard or to the environs.

1.2.3 ADMINISTRATIVE CONTROLS. ADMINISTRATIVE CONTROLS delineate the organization and management responsibilities, record keeping, review and audit and reporting requirements considered necessary to assure the safe, long-term anchorage of the STURGIS in the James River Reserve Fleet.

2.0 RADIOACTIVE RELEASES

There will be no radioactive liquid waste discharges to the environment while the STURGIS is anchored in James River Reserve Fleet.

3.0 ADMINISTRATIVE CONTROLS

3.1 ADMINISTRATIVE RESPONSIBILITY

The decommissioned Nuclear Power Barge STURGIS is presently under the administrative control of the Commander and Director, US Army Facilities Engineering Support Agency. When the STURGIS is relocated to the James River Reserve Fleet the administration of the vessel will be in accordance with the Interagency Support Agreement between the Maritime Administration (MARAD) and the US Army Facilities Engineering Support Agency (USAFESA).

Radiological safety and environmental monitoring aspects of the long-term storage of the STURGIS will be the responsibility of USAFESA. The periodic radiation surveys and environmental sampling will be administered by USAFESA in accordance with requirements of the Post Decommissioning Surveillance Plan. While it is anchored in the James River Reserve Fleet the STURGIS will be under the custody of the Fleet Superintendent for security control and ship maintenance.

3.2 RECORDS

In addition to records required by applicable NRC regulations, the following records will be maintained by USAFESA:

- (1) Health physics records (personnel exposure and area surveys)
- (2) Records of Review and Audit Committee Meetings
- (3) Reportable Occurrence Reports
- (4) Annual Reports

2.0 RADIOACTIVE RELEASES

There will be no radioactive liquid waste discharges to the environment while the STURGIS is anchored in James River Reserve Fleet.

3.0 ADMINISTRATIVE CONTROLS

3.1 ADMINISTRATIVE RESPONSIBILITY

The decommissioned Nuclear Power Barge STURGIS is presently under the administrative control of the Commander and Director, US Army Facilities Engineering Support Agency. When the STURGIS is relocated to the James River Reserve Fleet the administration of the vessel will be in accordance with the Interagency Support Agreement between the Maritime Administration (MARAD) and the US Army Facilities Engineering Support Agency (USAFESA).

Radiological safety and environmental monitoring aspects of the long-term storage of the STURGIS will be the responsibility of USAFESA. The periodic radiation surveys and environmental sampling will be administered by USAFESA in accordance with requirements of the Post Decommissioning Surveillance Plan. While it is anchored in the James River Reserve Fleet the STURGIS will be under the custody of the Fleet Superintendent for security control and ship maintenance.

3.2 RECORDS

In addition to records required by applicable NRC regulations, the following records will be maintained by USAFESA:

- (1) Health physics records (personnel exposure and area surveys)
- (2) Records of Review and Audit Committee Meetings
- (3) Reportable Occurrence Reports
- (4) Annual Reports

Duplicate Page

3.3 VISITORS

Any visitors on board the STURGIS will be accompanied by representatives of MARAD, USAFESA or contractor representatives of USAFESA.

3.4 REPORTS

Annual Report

1. A written annual report shall be prepared by USAFESA and submitted to the Chief of Engineers, ARCHS (DAEN-FEZ) prior to 1 April of the calendar year following the reporting period. The report should include as a minimum the following:

- a. Status of the facility
- b. Results of quarterly radiation surveys
- c. Results of quarterly environmental sample analysis surveys
- d. Results of quarterly intrusion alarm system checks and structural surveillance
- e. A description of any maintenance or modifications
- f. Any abnormal degradation of one of several boundaries which contain the radioactive materials on board the STURGIS.

2. Any substantial variation of the ENTOMBMENT condition of the MH-1A facility from the condition described in the DA Authorization for Radioactive Material or the Technical Specifications shall be reported by USAFESA to Chief of Engineers, DAEN-FEZ.

(3.) Reportable Occurrence. A Reportable Occurrence Report shall be made by USAFESA to the Chief of Engineers, DAEN-FEZ by telephone within 24 hours of a reportable occurrence. Reportable occurrences are defined as follows:

- a. The entrance of an unauthorized person or persons into the controlled radiation areas

b. A significant change in the radiation or contamination levels in the facility.

c. Any grounding of the vessel or damage to the mooring due to severe weather conditions or abnormal occurrences.

d. Major flooding* or sinking of the vessel. Such information shall be transmitted within 24 hours by telephone or telegram to the Chief of Engineers, DAEN-FEZ and followed by a written report within 30 days.

3.5 PROCEDURES AND SPECIAL INSTRUCTIONS

All operations on the STURGIS which may involve radiological safety of maintenance personnel or work in restricted access areas will be carried out in accordance with written procedures that cover the following:

a. Procedures for accomplishing the work in a safe and efficient manner

b. Emergency conditions involving potential or actual release of radioactivity

c. Surveys in the restricted access areas.

These procedures and any subsequent revisions will be reviewed by the Maritime Administration's Reserve Fleet Superintendent or his designated alternate, and approved by the Review and Audit Committee.

3.6 REVIEW AND AUDIT COMMITTEE

1. After the vessel has been located in the James River Reserve Fleet, there will be a Review and Audit Committee consisting of the following personnel:

a. USAFESA Technical Director (chairman)

b. Reserve Fleet - Fleet Superintendent

* Major flooding is defined as the flooding of at least one major ship compartment. The STURGIS is designed to remain afloat with two (2) major compartments flooded.

- c. Reserve Fleet - Fleet Engineer or Fleet Captain
- d. USAFESA designated representative (alternate chairman)

Three members, one of which shall be a. or d. above, shall constitute a quorum

2. The Committee will review the following for safety of personnel and the general public, including a determination of whether any proposed change involves an unreviewed safety question:

- a. Proposed changes to the Technical Specifications
- b. Proposed changes or modifications to the vessel's entry alarm system, ENTOMBMENT status or mooring plan
- c. Substantive changes to radiation surveys or security surveillance procedures
- d. Reportable Occurrence Reports
- e. Annual Reports
- f. Disposition plans

3. The Committee shall be convened by the Chairman and shall meet at least annually to review and discuss results of the preceding period. The Committee will meet when necessary in the event of grounding or sinking of the vessel. Written minutes of all meetings shall be prepared and distributed to all committee members.

4. The Committee shall investigate and submit a report to USAFESA of any unauthorized entry of a controlled radiation area.

5. Any changes which involve an unreviewed safety question will be submitted by USAFESA to ARCHS for approval in accordance with AR 385-80 prior to implementation.

3.7 SURVEILLANCE REQUIREMENTS

Surveillance and environmental monitoring of the STURGIS in the James River Reserve Fleet will be done as specified in the MH-1A Post Decommissioning

Site Surveillance Plan.

Post Decommissioning SURVEILLANCE REQUIREMENTS are as follows:

a. The secondary shield plug will be in place and the refueling room overhead crane will be disabled.

b. The containment refueling access hatch and the spent fuel tank cover will be bolted in place with tamper indicating welds intact.

c. The refueling room forward entrance will be posted, sealed and locked. Aft entrances will be sealed and welded shut.

d. All other entrances to the ship will be secured from the inside and sealed except one door for security and maintenance checks. This door will be locked.

e. Normal entrances in item c. above will be outfitted with intrusion alarms with audible and visual signals.

f. At night, on weekends and holidays, when normal fleet personnel are off site, security personnel will patrol the Reserve Fleet in a small boat at various intervals and at least once during a twenty-four hour period.

g) Periodically and at least quarterly, Maritime Administration personnel or contractor representative personnel will inspect the seals on refueling room doors, on the spent fuel tank cover, containment refueling access cover, assure that the biological shield plug is in place and test the intrusion alarms in item e.

h. Quarterly, radiation survey of the ship will be made in accordance with the Post Decommissioning Surveillance Plan.

i. Quarterly, water samples and bottom sediment samples will be taken adjacent to the ship, analyzed and reported in accordance with the Post Decommissioning Surveillance Plan.

j. Flotation markings will be painted fore and aft (at the draft markers). These will be observed daily to check if the draft has increased. If the draft has increased, the ship is entered and the water in-leakage located. The source of in-leakage will be determined, the ship pumped out, and repairs made as may be required, including drydocking if determined necessary, in order to assure the integrity of the hull is maintained.

k. The Reserve Fleet Security Office will notify the USAFESA within 24 hours if the vessel is entered by unauthorized persons. USAFESA will then notify the Chief of Engineers, DAEN-FEZ, immediately if a controlled radiation area has been entered without proper authorization.

l. A cathodic protection system will be provided to protect the underwater areas of the vessel's hull to minimize corrosion damage to the hull.

m. An inspection of the hull and of the mooring will be conducted at least annually. The vessel will be drydocked if hull inspection determines that such action is necessary due to localized severe pitting, underwater plate thinning in excess of 40 percent, or other damage that would require corrective action.

n. The surveillance indicated in items h. and i. above will be conducted at least annually after the first three years of anchorage in the James River Reserve Fleet.

MII-1A POST DECOMMISSIONING
SITE SURVEILLANCE PLAN

U. S. ARMY
FACILITIES ENGINEERING SUPPORT AGENCY
FORT BELVOIR, VIRGINIA

a summary of the conduct of the survey, evaluation of data, and conclusions or recommendations as a result of data evaluation.

4.2 ROUTINE RADIOLOGICAL SURVEY REPORT

Prepared by FESA organizational element responsible for collecting samples, analysis of samples, evaluating the analysis and making necessary recommendations. Report shall include a summary of collecting, analysis, and conclusions or recommendations as a result of evaluations. Data sheets shall be appended.

4.3 ACCIDENT OR INCIDENT REPORT

Prepared by individual in responsible charge of the person or group discovering the accident or incident. Included are all events defined as accidents or incidents by MARAD or FESA not included in Reportable Occurrences or Special Surveys. Report shall contain a summary of the discovery or occurrence of the accident or incident and the outcome or resultant events.

4.4 SPECIAL RADIOLOGICAL SURVEY REPORT

Prepared by FESA organizational element responsible for conducting the sampling, analysis of samples, evaluating the analysis and making necessary recommendations. Report shall include collecting, analysis and conclusions or recommendations as a result of evaluations. Data sheets shall be appended.

4.5 ENVIRONMENTAL SURVEY REPORTS

Preparation and content shall be as stated for Routine Radiological Survey Report.

4.6 REPORTABLE OCCURRENCES

A reportable occurrence report shall be made to the Chief of Engineers, DAEN-FEZ, by telephone within 24 hours of a reportable occurrence. A written report of the investigation and conclusions shall follow as soon as practicable. Reportable occurrences are as follows:

1. The entrance of an unauthorized person or persons into the restricted access areas
2. A significant change in the radiation levels in the facility
3. Any grounding of the vessel due to severe weather conditions or abnormal occurrences
4. Major flooding or sinking of the STURGIS. (Major flooding is defined as the flooding of at least one major ship compartment. The STURGIS is designed to remain afloat with two major compartments flooded.)

4.7 VARIANCE REPORT

Any substantial variance of the conditions of the facility from those described in the application for Department of the Army Radioactive Material Authorization shall be reported in the same manner and channels as Reportable Occurrences.

4.8 ANNUAL REPORT

Prepared by FESA organizational element in responsible charge of monitoring all operations concerning the STURGIS. Content and distribution shall be as specified in the STURGIS Technical Specifications and in accordance with AR 385-80.

5.0 SURVEY PERIODS AND INTERVALS

Quarterly means covering the period of a calendar quarter. The actual interval shall not be less than 11 weeks nor greater than 15 weeks.

Annually means covering the period of a calendar year. The actual interval shall not be less than 11 months nor greater than 14 months.

CONTENTS

	<u>Page</u>
A. SHIP SURVEILLANCE PROGRAM	1
1.0 STRUCTURAL SURVEY	1
2.0 RADIOLOGICAL SURVEY	4
2.1 ROUTINE SURVEY	4
2.1.1 THERMOLUMINESCENT DOSIMETERS (TLD's).	4
2.1.2 AIR SAMPLES	5
2.1.3 FREQUENCY	7
2.2 SPECIAL SURVEY	7
B. ENVIRONMENTAL SURVEILLANCE PROGRAM	7
1.0 INITIAL SURVEY.	7
2.0 ROUTINE SURVEY	8
3.0 SAMPLE ANALYSIS	8
C. ADMINISTRATIVE CONTROLS	8
1.0 ADMINISTRATIVE RESPONSIBILITY	8
2.0 RECORDS	9
2.1 RADIATION SURVEILLANCE LOG	9
2.2 REPORTABLE INCIDENT LOG	9
2.3 REPORT FILES	9
3.0 VISITORS	9
4.0 REPORTING	9
4.1 STRUCTURAL SURVEY REPORT	9
4.2 ROUTINE RADIOLOGICAL SURVEY REPORT	10

CONTENTS (Continued)

Page

C. ADMINISTRATIVE CONTROLS (Continued)

4.3	ACCIDENT OR INCIDENT REPORT	10
4.4	SPECIAL RADIOLOGICAL SURVEY REPORT	10
4.5	ENVIRONMENTAL SURVEY REPORTS	10
4.6	REPORTABLE OCCURRENCES	10
4.7	VARIANCE REPORT	11
4.8	ANNUAL REPORT	11
5.0	SURVEY PERIODS AND INTERVALS	11

A. SHIP SURVEILLANCE PROGRAM

The MH-1A Nuclear Power Plant ceased operation in July 1976. Decommissioning of the MH-1A began at Fort Belvoir, Virginia, in April 1977 and, when finished, the following major actions will have been completed.

1. All fuel assemblies, control rods, pressure vessel surveillance samples, poison finger rod assemblies, and core poison pins as well as all radioactive liquids and wastes will be removed from the site.
2. All tanks which contained radioactive fluids will be emptied, cleaned, closed and sealed.
3. All penetrations (pipes, electrical cables, instrumentation leads, etc.) through the containment vessel will be disconnected or cut, blank flanged or capped and sealed.
4. The containment vessel access door will be closed and sealed, the secondary shield plug will be placed in position and the lifting equipment will be disabled.

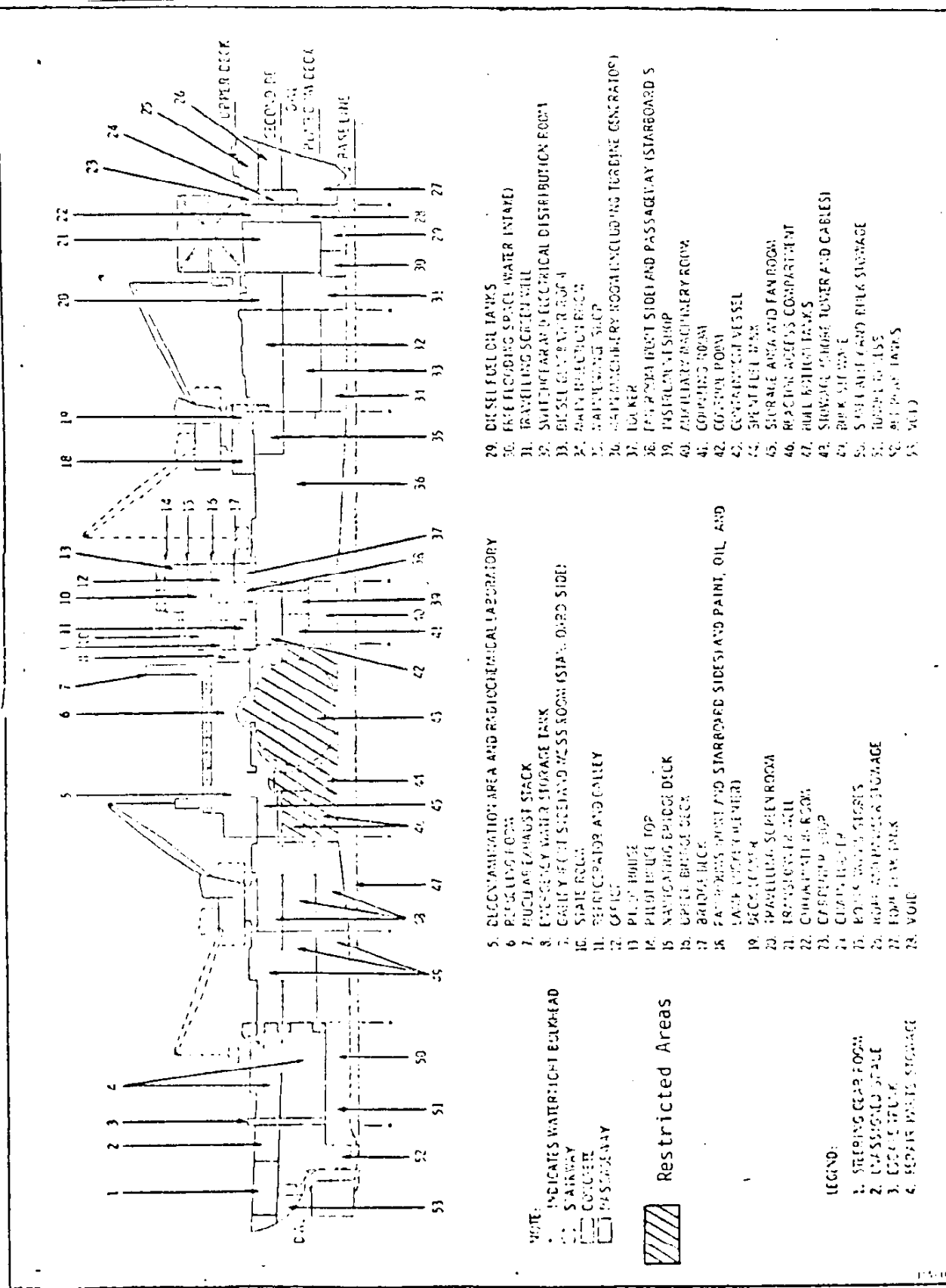
Thus, all residual radioactive material on board the STURGIS will be confined to the following restricted access areas; the containment vessel, the spent fuel storage tank, and the reactor access compartment. Figure 1 shows the location of these areas on the STURGIS and Figure 2 shows the restricted area accesses. A two-part ship surveillance program will be conducted to insure the integrity of the boundaries of these restricted access areas. The two parts are structural survey and facility radiation survey.

1.0 STRUCTURAL SURVEY

En route from Fort Belvoir to the James River Reserve Fleet, the STURGIS will enter a drydocking facility for additional work preparatory to long-term storage. Among the tasks to be performed are the exterior painting (above and below the waterline), the sealing of all hull penetrations, the closing of all topside penetrations, the installation of a dehumidification system for the vessel interior and the installation of additional cathodic protection for the hull.

There are three structural barriers between the radioactive material on board the STURGIS and the areas of the vessel which are accessible. These barriers are (1) the locked or secured entrances to the refueling room, (2) the sealed restricted area access and (3) the sealed containment vessel and tanks containing the material. As long as these barriers remain intact there will be no radioactive releases from the STURGIS.

FIGURE 1 -
1A-1A INBOARD PROFILE



Since all exterior penetrations through the hull will have been closed and all other means of access either locked or sealed, the structural survey of the STURGIS will consist of the following:

1. Assure that all entrance hatchways (doors) into the STURGIS are secured and sealed or are locked.
2. Assure that the gangway and entrance ways have functioning intrusion alarms with remote audible and visual signals.
3. Security personnel will visually check the STURGIS from a small boat at least once during each 24-hour period at various unscheduled intervals. This patrol will be active during the hours of darkness, on weekends, on holidays and other times when the normal fleet personnel are off-site.
4. At least once each calendar quarter the seals and locks on the restricted area accesses will be inspected, and all ship intrusion alarms will be tested.
5. At least once each calendar year an underwater inspection of the hull will be conducted.
6. At least once each calendar quarter the installed sounding tubes will be used to monitor the bilge and ballast tanks for accumulation of water.
7. At least once each calendar quarter the vessel interior will be inspected for evidence of water accumulation due to structural leaks.
8. The STURGIS will be drydocked after five years for a thorough inspection. The data gathered will be used to program future drydocking requirements and intervals to insure long-term structural integrity.

2.0 RADIOLOGICAL SURVEY

2.1 ROUTINE SURVEY

To supplement the structural surveillance program, the interior of the STURGIS will be monitored to determine on-board radiation levels. This monitoring will be performed using thermoluminescent dosimeters and air samplers.

2.1.1 THERMOLUMINESCENT DOSIMETERS (TLD's)

The TLD's will be placed in locations which would be most likely to receive increased radiation exposure in the unlikely event of a change in the "as stored" condition. The changes could result in higher radiation levels outside the restricted access areas on board the STURGIS. Not less than five TLD chips will be placed in each location. Chip holders will be secured against movement with masking tape, or may be contained in additional

improvised holders or boxes. The TLD locations, reflected in Figure 3 using the same guide numbers, will be as follows:

- a. On the top of the containment vessel dome.
- b. On the top of the spent fuel storage tank.
- c. On the top of the concrete plug covering the access to the reactor access compartment.
- d. In the radiochemical lab area of the refueling room
- e. On the forward refueling room wall
- f. On the starboard refueling room wall
- g. On the port refueling room wall
- h. On the aft wall of the control room
- i. On the aft wall of the instrument shop
- j. On the aft wall of the auxiliary machinery room
- k. On the aft mess room wall
- l. In the pilot house
- m. On the forward wall of the electrical distribution room
- n. On a ship or on shore not less than 500 yards from the containment vessel. (Location must be negotiated with MARAD.)

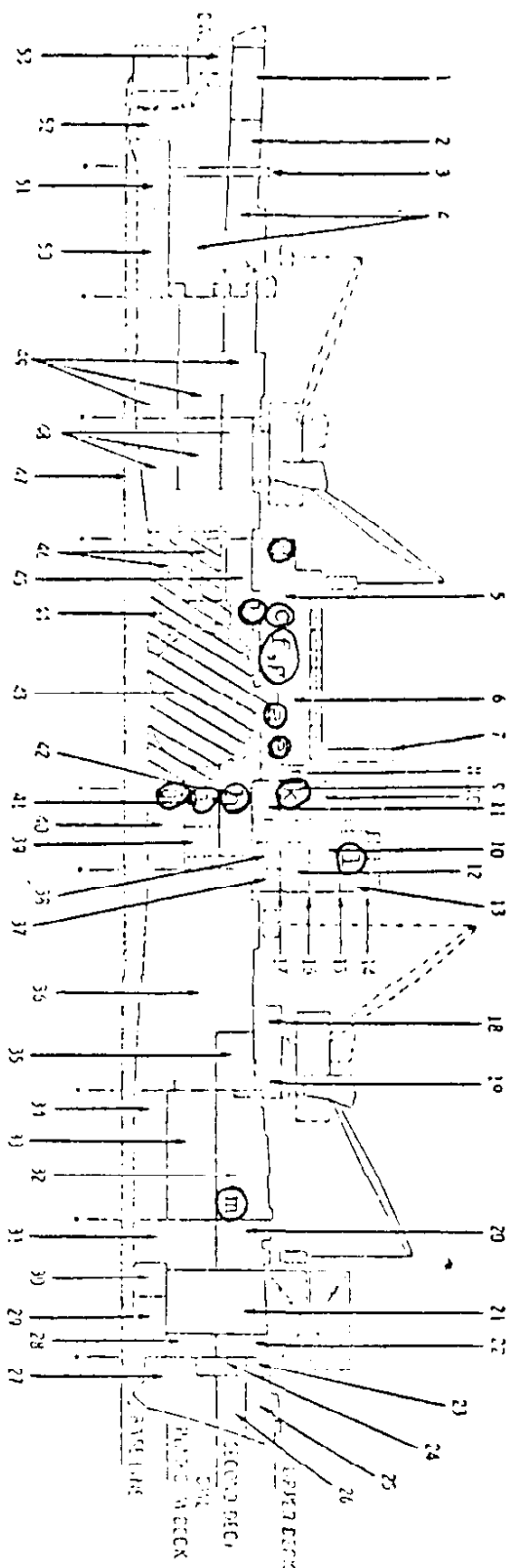
Three chips shall be read and the average of the three values used as the true value. The balance of the chips should be held for thirty days in the event confirmation of the readings is necessary.

2.1.2 AIR SAMPLES

The concentration of long-lived airborne radioactivity should remain relatively constant on board the STURGIS since all exterior penetrations are sealed. Any increase in these concentrations would therefore come from within the STURGIS and would necessitate investigation. For monitoring purposes, samples of 1000 to 1500 cubic feet will be taken in the refueling room (three samples, one in the old radiochemical lab area, one near the containment vessel dome, and one on the fan deck near the spent fuel storage tank cover), the control room, the auxiliary machinery space, the mess hall and the pilot house.

While the air sampler is running, the radiation signs will be examined and any which are not easily readable will be replaced.

FIGURE 3
THERMOLUMINESCENT DOSIMETER LOCATIONS



NOTE:
1. INDICATES WALKWAY BULKHEAD
2. STAIRWAY
3. CORRIDOR
4. PASSAGEWAY



Restricted Areas

LEGEND:
1. SLEEPING QUARTERS
2. LIVING AREA
3. KITCHEN
4. RECREATION AREA

5. RECREATION AREA AND RECREATIONAL LABORATORY
6. RECREATION ROOM
7. RECREATION ROOM
8. RECREATION ROOM
9. RECREATION ROOM
10. RECREATION ROOM
11. RECREATION ROOM
12. RECREATION ROOM
13. RECREATION ROOM
14. RECREATION ROOM
15. RECREATION ROOM
16. RECREATION ROOM
17. RECREATION ROOM
18. RECREATION ROOM
19. RECREATION ROOM
20. RECREATION ROOM
21. RECREATION ROOM
22. RECREATION ROOM
23. RECREATION ROOM
24. RECREATION ROOM
25. RECREATION ROOM
26. RECREATION ROOM
27. RECREATION ROOM
28. RECREATION ROOM
29. RECREATION ROOM
30. RECREATION ROOM
31. RECREATION ROOM
32. RECREATION ROOM
33. RECREATION ROOM
34. RECREATION ROOM
35. RECREATION ROOM
36. RECREATION ROOM
37. RECREATION ROOM
38. RECREATION ROOM
39. RECREATION ROOM
40. RECREATION ROOM
41. RECREATION ROOM
42. RECREATION ROOM
43. RECREATION ROOM
44. RECREATION ROOM
45. RECREATION ROOM
46. RECREATION ROOM
47. RECREATION ROOM

29. DIESEL FUEL OIL TANKS
30. DIESEL FUEL OIL TANKS
31. DIESEL FUEL OIL TANKS
32. DIESEL FUEL OIL TANKS
33. DIESEL FUEL OIL TANKS
34. DIESEL FUEL OIL TANKS
35. DIESEL FUEL OIL TANKS
36. DIESEL FUEL OIL TANKS
37. DIESEL FUEL OIL TANKS
38. DIESEL FUEL OIL TANKS
39. DIESEL FUEL OIL TANKS
40. DIESEL FUEL OIL TANKS
41. DIESEL FUEL OIL TANKS
42. DIESEL FUEL OIL TANKS
43. DIESEL FUEL OIL TANKS
44. DIESEL FUEL OIL TANKS
45. DIESEL FUEL OIL TANKS
46. DIESEL FUEL OIL TANKS
47. DIESEL FUEL OIL TANKS

2.1.3 FREQUENCY

The routine radiological survey program detailed above will be conducted quarterly for the first three years of anchorage in the James River Reserve Fleet and annually thereafter. When TLD's are removed for reading, replacements shall be placed in the locations.

2.2 SPECIAL SURVEY

From time to time, circumstances may necessitate performing special radiological surveillance on board the STURGIS. Examples of circumstances which would require special radiological surveillance are: evidence of water accumulation in ship compartments, evidence of tampering with the restricted access area closures and flooding of a ship compartment.

When required, these special radiological surveys will be performed by personnel from or a representative of the U. S. Army Facilities Engineering Support Agency, Fort Belvoir, Virginia.

B. ENVIRONMENTAL SURVEILLANCE PROGRAM

An environmental surveillance program will be conducted in order to detect any increase in the existing radioactivity levels which may be indicative of a breach in the protective barriers or their closures. Samples of the environmental media most likely to be affected by a radioactivity release will be collected at location(s) near the restricted access areas.

1.0 INITIAL SURVEY

Prior to the arrival of the STURGIS or not more than ten days following mooring in the James River Reserve Fleet, environmental samples in the vicinity of the STURGIS berth will be taken to characterize the background radioactivity concentrations in the river water and bottom sediment. For this purpose, the berth will be divided into eight sectors by halving the berth approximately on the line connecting the mooring buoys and dividing the area between buoys into four parts. These areas shall be identified as left and right and numbered one through four. All determinations will be made while facing upstream. A water sample of not less than two litres shall be drawn from each area. Samples shall be drawn from a depth not to exceed one metre approximately at slack high tide and approximately 20 metres from the halving line. Sediment samples of not less than 25 grams shall be drawn from locations approximately identical to those of the water samples. Precautions should be taken to assure sampling not deeper into the sediment than 20 centimetres and to assure that the surface fraction of sediment is included in the sample and not lost as turbidity to the water. Samples shall be dated, identified by the designation of the area from which they were drawn and shall be transported in containers which will assure sample integrity. A portion of each sample sufficient for separate analysis shall be held for 30 days in the event confirmation of results is needed.

2.0 ROUTINE SURVEY

Water and sediment samples shall be drawn from two areas (as defined for initial sampling program) approximately 3 metres outboard of the STURGIS hull for each survey. Areas shall be R3 and L2 for the odd numbered surveys and R2 and L3 for the even numbered surveys. Samples shall be collected, identified and handled as specified for initial samples.

The samples will be collected quarterly for the first three years of mooring in the James River Reserve Fleet and annually thereafter. When sampling annually, samples will be drawn from all four sampling areas.

3.0 SAMPLE ANALYSIS

Samples will be collected, processed and counted using, as a guideline, the methods specified herein and the methods outlined in USAFESA's Health Physics - Process Control Reference Manual, dated 1 July 1966 (as amended) or equivalent. In the event an individual sample shows abnormally high activity, the following action will be taken:

1. The counting system reliability will be verified and the withheld portion of the sample will be processed and counted.
2. If this confirms the results of the first analysis, additional samples will be taken to verify the condition.
3. If the condition is verified, an investigation will be conducted by FESA to determine the source of the radioactivity. If it is determined that the STURGIS is the source, FESA will initiate action to correct the situation.
4. FESA will prepare a special report which describes the occurrence and the investigative results. This report will be forwarded to ARCHS as specified in the Administrative Controls section.

C. ADMINISTRATIVE CONTROLS

1.0 ADMINISTRATIVE RESPONSIBILITY

When relocated and moored, the STURGIS will be in the custody of the Superintendent of the James River Reserve Fleet who will be responsible for security control and structural surveillance.

Environmental sampling, radiation surveys and laboratory analyses will be performed by qualified personnel from USAFESA or its contractor. The qualifications for these personnel shall be one year of specialized training in health physics or equivalent including training in environmental sampling and three years of work experience related to radiological health and safety.

USAFESA will be responsible for administration of the Department of the Army Radioactive Material Authorization for the residual radioactive material confined on board the STURGIS.

2.0 RECORDS

The following records will be maintained by FESA:

2.1 RADIATION SURVEILLANCE LOG

This log shall contain the records of collection and replacement of TLD's, collection of air samples, collection of water and sediment samples, equipment used and the names of individuals doing the sampling. Date, time and weather conditions should be shown.

2.2 REPORTABLE INCIDENT LOG

This log shall contain date, time and summary of incident, name of discovering individual, circumstances of discovery, date and time of results of investigation.

2.3 REPORT FILES

The files shall contain copies of the following reports.

1. Structural survey report *MARAD report*
2. Routine radiological survey report *known*
3. Accident or incident report *MARAD report*
4. Special radiological survey report *known*
5. Initial environmental survey report
6. Routine environmental survey report
7. Reportable Occurrence report *MARAD report*
8. Variance report
9. Annual report.

3.0 VISITORS

Any visitor on board the STURGIS will be accompanied by individuals representing FESA or MARAD.

4.0 REPORTING

The following reports shall be made by the individual or agency stated herein. Minimum distribution of any report shall be to FESA-HQ and MARAD-JRRF-HQ.

4.1 STRUCTURAL SURVEY REPORT

Prepared by MARAD organizational element responsible for evaluating collected data and making the necessary recommendations. Report shall include